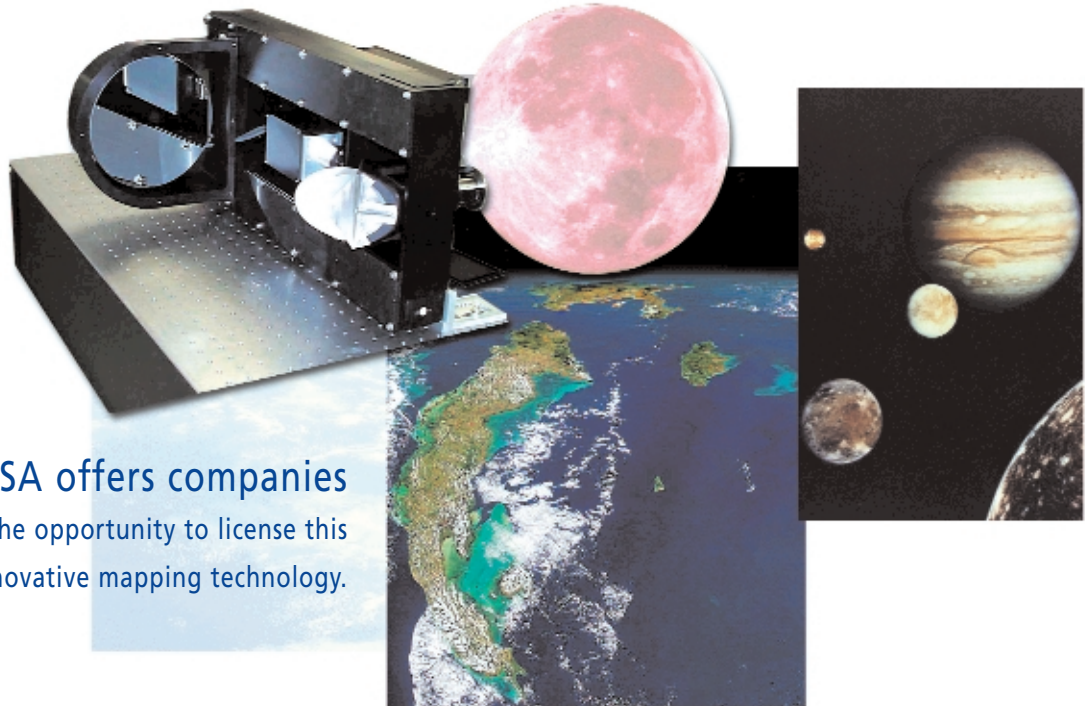


New Photon-Counting Microaltimeter



NASA offers companies
the opportunity to license this
innovative mapping technology.

Developed at **NASA Goddard Space Flight Center**, the photon-counting microaltimeter technology offers a smaller, faster, less expensive, more reliable, and more power-efficient alternative to current laser altimeter systems. The advanced signal processing software in NASA Goddard's technology allows users to create rapid, accurate three-dimensional topographic maps of various types of terrain on Earth from conventional aircraft platforms flying at cruise altitudes and of surfaces of celestial bodies from satellites in low orbit.

Benefits

- **Small:** Size of the telescope and laser is dramatically reduced.
- **Light:** Microaltimeter weighs less than existing state of the art.
- **Rapid:** Technology has scanning capability and multikilohertz sampling rates, generating maps immediately.
- **Inexpensive:** Off-the-shelf, simplified components ensure low cost.
- **Reliable:** Technology has a high life cycle with repeatable results.
- **Power efficient:** Microaltimeter has up to two orders of magnitude greater sampling rates for a given laser power.
- **Versatile:** Maps can be created in both daytime and nighttime conditions at normal aircraft cruise altitudes.
- **High resolution:** Photon counting combined with multi-element detectors provides high spatial resolution and improved scene registration.



National
Aeronautics and
Space
Administration



Commercial Applications

NASA Goddard's microaltimeter technology can be used to create three-dimensional topographic maps for the following:

General Surveying

- Land
- Ice
- Sea
- Forest

Aerospace

- Asteroids
- Planets
- Moons
- Comets

Commercial Opportunities

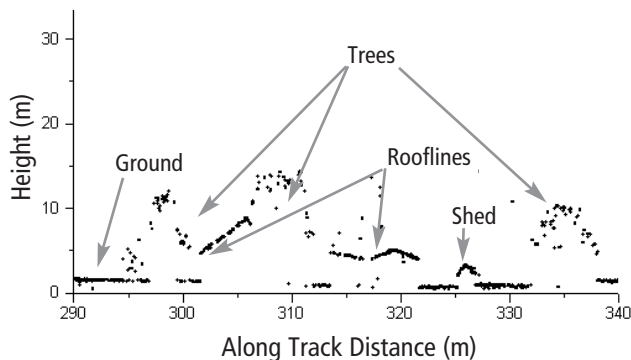
This technology is part of NASA's technology transfer program. The program seeks to stimulate commercial use of NASA-developed technologies. A patent covering this invention was issued in 2002 (US 6,343,245). An engineering test flight and several science flights have been successfully completed. NASA invites companies to consider licensing the photon-counting microaltimeter for use in commercial applications. NASA is flexible in its agreements, and opportunities exist for exclusive, nonexclusive, and exclusive field-of-use licensing.

More information about working with NASA Goddard's Technology Commercialization Office is available online.

<http://techtransfer.gsfc.nasa.gov>

The Technology

NASA Goddard Space Flight Center has developed a photon-counting three-dimensional imaging altimeter technology that can be used on orbiting satellites or on a conventional aircraft platform operating at cruise altitudes between 20,000 ft and 40,000 ft. NASA Goddard's technology uses low-energy pulses at multikilohertz fire rates to obtain high-resolution spatial data from the surface being examined. In January 2001, NASA Goddard flew the first engineering test flight for this new microaltimeter technology. Current laser altimeter systems use higher energy pulses and must be flown at 2,000 ft to 3,000 ft; NASA Goddard's microaltimeter technology, however, was flown successfully in an airplane at 22,000 ft and used less than 2 μ J of energy per pulse with a 14 cm receive aperture in full daylight (see graph below). The results of this test proved that the technology can fly at high altitudes without requiring large energy supplies.



NASA Goddard's innovative microaltimeter can increase the surface sampling rate by up to two orders of magnitude for the same average laser power using a much smaller telescope. Furthermore, using multi-element detectors, it can accurately identify where in the field of view the detected photon originated, removing much of the ambiguity that characterizes conventional multiphoton surface returns and improving spatial resolution and registration. In addition, single-pulse energies in the microaltimeter are typically two orders of magnitude smaller than in current systems, making the instrument more eye safe and less prone to internal optical damage.

For More Information

If you would like more information about this technology or about NASA's technology transfer program, please contact:

Anel Flores

Technology Commercialization Office

NASA Goddard Space Flight Center

Phone: (301) 286-1098

Fax: (301) 286-0301

E-mail: Anel.Flores.1@gsfc.nasa.gov